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Editorial

THE PRESENT POSITION OF THE PROFESSION.

THAT the profession is still very much alive, notwithstanding the comparative disappearance of the horse off the streets was well illustrated at the recent Congress of the National at Ayr, where the Scottish Section gave a great welcome to their fellow members ; the result being one of the most enthusiastic and best attended meetings which has ever been held. The discussions were well sustained, the surgical demonstrations well attended, and everybody seemed satisfied. In Scotland, as in England, there appeared a difficulty in obtaining a sufficiency of assistants to supply the needs of the practitioner ; and even in instances where the salary offered was good, the shortage of suitable candidates was manifest. This is undoubtedly to some extent accounted for by the openings which have been made for our younger graduates by the Public Health authorities, and it is to these younger men that a word of caution is necessary in that they must consider well the terms and prospects, and especially the limitations and slow rises of salary generally offered, before acceptance ; as once in

the groove of municipal or government service it is difficult to re-enter private practice, and in many instances the rise of salary is very slow—unjustifiably so—and much slower than an ambitious man can make by his own exertions in private practice.

The opportunities which lie before the young graduate of to-day are infinitely greater than they were thirty years ago, whilst they are increasing both in number and value, it remains for the Council, who are the advisers of the profession, as well as the individual members themselves to see that we let no opportunity slip to press our claims.

State Veterinary Medicine is at last coming into its own ; and Veterinary Research too, as evidenced by the recent establishment by the Empire Marketing Board, of three Fellowships at Onderstepoort Laboratory, at £1,000 a year each, is at last receiving tardy, but fair, recognition. Let us hope that each of these Fellowship posts will be gained by a Veterinarian. There never was a time in the history of the profession when the opportunity to make itself felt, was greater, for the positions to be filled in all branches far exceed the supply ; and the suitable graduate of the present day is able to make a selection which his forbears never dreamt of ; a selection not only of positions to fill, but of post-graduate study which is only at present on the threshold, in England, of what it will become within the next decade.

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General Articles

THE EXPERIMENTAL VERIFICATION OF THE QUESTION AS TO THE PURPOSE OF THE FILIFORM PROCESS ON THE RAM'S PENIS; AND THE POSSIBILITY OF PRODUCING STERILITY BY AMPUTATION.

By PROFESSOR E. J. JWANOW,

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In the classic manual of "Physiology of Reproduction" by F. Marshall (page 260-261) (1) we read:

"The fact that the filiform prolongation is an erectile organ points to the conclusion that its function is insertion into the os uteri during copulation. An examination of the uterus in the sheep shows that the os, when open, is fully large enough to admit of the entrance of the distal portion of the penis in the region of the glans. If the extreme distal end does so enter, the filiform process must extend into the cavity as far, or nearly as far, as the junction of the relatively short corpus uteri with the two cornua. That the appendage functions in the manner described seems additionally probable in view of the fact, to which sheep-breeders attest, that if the process is cut off the ram is rendered barren. Professor Robert Wallace informs me that it used to be a regular practice, for the protection of ewes while being driven south from the Highlands of Scotland, to cut off the filiform appendage from the rams to prevent them from impregnating the ewes on the way, this method of inducing sterility proving quite as effective as removal of the testicles."

Let us quote one more extract from the later work of F. Marshall and J. Hammond (page 16-17) (2):

"The semen (as well as the urine) must past through this tubular prolongation before being discharged, and there can be little doubt that its function is insertion into the os uteri during coitus, for it is believed that if the 'worm' is cut off the ram is rendered barren. Thus, ram traders, when wishing to discard tups for breeding purposes, have been known to remove the appendage before sending the ram to market. Many novices are said to have been deceived by this practice, called 'worming,' for such rams may be bought in open market by unscrupulous dealers, who pass them on as sound sires, though they themselves have only paid a 'butcher's' price for them. It is not certain, however,

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that the removal of the appendage always induces sterility, and it may be easily understood that as long as the spermatozoa can be injected into the vagina of the ewe, some at least may effect an entrance into the uterus and so reach the ova. This is probably the explanation of those cases which have been reported where it is said that 'wormed' tups have yet been fertile. It is probable that the precise truth is that whereas the integrity of the filiform appendage is as a general rule essential for fertility, yet exceptional cases have occurred in which 'worming' has not brought about sterility, in just the same kind of way as incomplete coitus in other animals is sometimes followed by pregnancy in the female. Moreover, it is clear that any injury to such a delicate structure as the filiform appendage may impair a tup's fertility, and one such case has come under the writers' observation. It is desirable, therefore, that when a ram is suspected of being infertile an examination of the filiform appendage should be made."

The considerations mentioned by the above-named authors have not yet been experimentally verified. As to the information got from sheep-breeders, it can hardly be considered as indisputable. Besides, the sterility of rams after the amputation of filiform process even if it has taken place, can be explained not by the lesion and removal of an organ important in itself, but by the operation which artificially creates hypospady. The sperm of a ram thus operated (see Fig. No. 1) should not be ejected forwards, but somewhat to one side of and behind the glans penis. Thus, especially when the vagina of a sheep is narrow, and the penis is fairly well developed, a considerable amount of the sperm may be brought out from the vagina together with the penis, as it would with a piston, and this may greatly reduce the possibilities of conception.

In autumn of the year 1928, carrying out a mass experiment of the artificial insemination of sheep in North Caucasus I made some experiments with the purpose of clearing up the question as to how the amputation of processus uretrae affects the fertility of rams, and if it does, what is the resultant sterility of rams determined by. Five rams and 25 ewes of the Voloshsk breed were taken for the experiments. The age of the experimental ewes and rams varied from $2\frac{1}{2}$-$3\frac{1}{2}$ years. The state of nourishment was the average. The sexual organs were normal. The rams were not coupled in that covering season. The ewes were taken from the experimental band and were not yet inseminated in the given season. As may be seen in the table given (page 353), the experimental rams were allowed to cover 2 females, 3 or 4 days before the operation. On the 26/10 with the observation of the elementary rules of aseptics the filiform process of all 5 rams was cut off with sharp scissors, at the very base.

The Results of the Experiments before and after the Amputation of the Filiform Process.

NN of rams	Before Operation			After Operation done on 26/10/1928		
	NN of covered ewes	Date of covering	Results of covering	NN of covered ewes	Date of covering	Results of covering
6275	2707	22–10	Lost No.	5466	4–11	Brought 1 lamb ♀ on 31/3 29
	5379	23–10	Manifested heat on 7/11 28	2795	4–11	Lost No.
				5788	6–11	Perished on 24/12 with embryo
6280	5121	22–10	Manifested heat on 8/11	3093	4–11	Brought lamb ♂ on 2/4/29
				3134	5–11	Brought lamb ♀ on 31/3/29
	5079	23–10	Brought lamb ♀ on 20/3	5088	6–11	Brought lamb ♂ on 4/4 29
6281	3377	22–10	Brought lamb ♂ on 19/3/29	5047	4–11	Manifested heat on 21/11/28
				3565	5–11	Aborted on 16/2/29
	2800	23–10	Manifested heat on 8/11/28	4870	6–11	Lost No.
6282	2956	22–10	Brought lamb ♀ on 24/3 29	3415	4–11	Brought lamb ♀ on 24/3/29
				3163	5–11	Brought lamb ♀ on 11/4/29
	3236	23–10	Brought 2 lambs ♀ on 23/3/29	5947	6–11	Brought lamb ♀ on 6/4/29
6284	5506	22–10	Manifested heat on 7/11 28	4836	4–11	Brought lamb ♀ on 31/3/29
				3412	5–11	Aborted on 15/2/29
	3292	23–10	Aborted on 25/2/29	5699	6–11	Brought lamb ♂ on 31/3/29
Total :	Positive results 5 Negative „ 4 Unknown 1 10			Positive results 12 Negative „ 1 Unknown 2 15		

The cicatrization of the wound went on very rapidly, and 9 days afterwards the rams showed a strongly expressed desire to cover ewes. Each of them was allowed to cover 3 ewes. Both the first 10 ewes and

the remaining 15 were under close observation all the time. The test of test-rams went on till the end of December and was carried out in the presence and under the control of zootechnists, my collaborators. The result of these experiments, as shown in the table proved to be as follows : 15 or 16 days afterwards 4 of 10 ewes covered by the rams before the latter were operated, manifested heat and remained non-pregnant. Five ewes proved to be pregnant for certain, and one ewe which, after coupling, showed no heat till the end of December, remained unascertained, as it had lost its ring, owing to the severe frosts.

Only one of the 15 ewes covered by the operated rams manifested heat (on the 17th day) ; 12 ewes proved to be unquestionably pregnant, and it was impossible to find out exactly whether conception had taken place in 2 ewes, which had not manifested any heat for 2 months after the coupling, as they had lost their rings owing to the same reason.

Distal end of ram's penis, as seen from the left side, showing glans and filiform appendage. The prepuce is folded back. Slightly reduced. (From Fr. Marshall.)

The considerable increase of the per cent. of conceptions obtained from the experimental rams after the operation in comparison with the per cent. received from the same rams before the operation is explained, according to our opinion, by the fact that the first 10 ewes were covered by rams which were coupled that season for the first time. The first couplings of the season, according to my observations, later confirmed by others, should give a lower per cent. of conceptions. I pointed out this circumstance at an earlier date (3).

Thus, the principal argument upon which the above mentioned authors base their explanation of the purpose of the processus uretræ, falls away, and along with it the supposition that the sperm in the sheep is not ejaculated into the vagina, but into the uterus, becomes unacceptable.

Conclusions.

I. The amputation of the processus uretræ of a ram does not decrease its fertility, and therefore can by no means replace castration.

II. The former interpretation that the purpose of the processus uretræ is to enter the uterus and introduce the sperm directly into the uterus is not confirmed by experiments.

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III. The data obtained by us from experiments with rams deprived of processus uretræ, gives ground to believe, that in the sheep, as well as in the other species of domestic animals, the sperm is ejaculated not into the uterus,but into the vagina.

(1) "The Physiology of Reproduction," by Francis Marshall, 1922.
(2) "The Physiology of Animal Breeding with Special Reference to the Problem of Fertility," F. H. A. Marshall and John Hammond. Research Monograph, 2nd edition, London, 1926.
(3) See "E. Jwanow de la Fécondation Artificielle chez les Mammifères." Arch. des Sciences Biologiques, Vol. xii, 1907.

ANATOMICAL STUDIES, No. 10: OSSIFICATION IN THE LEFT DIAPHRAGMATIC CRUS OF A HORSE.

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THE occurrence of osseous tissue in unusual situations, e.g. fascia, muscle, etc., is not as uncommon in veterinary science as would be imagined by a study of the literature. The object of this note is to record such a case of connective tissue metaplasia. (Joest and Schieback 1924).

While dissecting the trunk of an aged gelding, 18701, killed 13/2/29, the left crus of the diaphragm was observed to contain an ossified structure measuring 4 c.m. x 2 c.m. x 0.5 c.m. On section a central space filled with a red marrow-like material was noted. After appropriate treatment, sections, cut by the freezing method, were stained with Bohmer's hæmatoxylin-eosin and examined as follows:

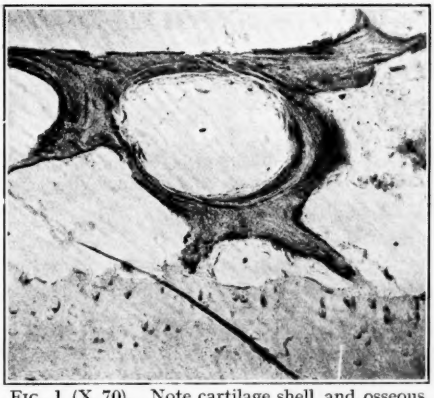

FIG. 1 (X 70). Note cartilage shell and osseous centre; radial arrangement of cartilage cells and basophilic capsules are clear.

Low power (see Fig. 1). An elongated shell of hyaline cartilage which generally stained pink was present. Within this and occupying approximately half of the short transverse diameter was osseous tissue represented

by Haversian systems. The cartilage cells around the circumference of the structure were small and parallel to the surface, whereas those around the periphery of the central focus of ossification showed typical proliferative changes, namely, enlargement, basophilic staining of newly formed matrix, and radial arrangement of cells. The older lamellar tissue of the Haversian systems stained violet, but immediately lining the canals was a pink edge representing the newly formed lamellar tissue or physiological osteoid. The bone cells, however, were recognised with difficulty owing to the method of preparing the section.

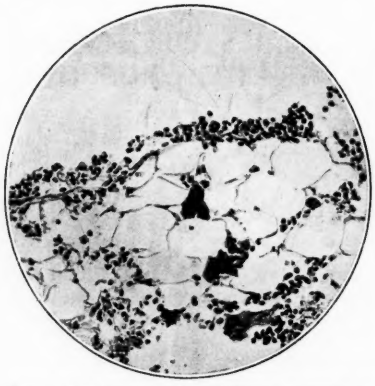

FIG. 2 (X 250). Note red bone marrow in which megakaryocytes are conspicuous.

High power (see Fig. 2). With this, the various elements of red marrow, occupying the spaces of the osseous tissues, could be easily seen. Prominent were the developmental forms of erythrocytes, megakaryocytes and eosinophilic myelocytes.

On considering this variety of metaplasia, it seems remarkable that bone should have replaced muscle, in other words, that cells, presumably connective tissue cells, should ultimately be changed into osteoblasts.

I desire to thank Dr. A. D. Thomas for arranging for preparation of the sections.

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Cowdry, E. V. (1928). Special Cytology II, 719. Paul B. Hoeber, New York.
Joest, E. and Schieback, P. (1924). Uber Herzwandverknöcherung Virchow's Archiv. Vol. 253. 472.

THE USE OF CHLOROFORM IN PIG SLAUGHTERING.

By D. J. ANTHONY, M.R.C.V.S., D.V.S.M.,
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IT is well known that certain drugs administered medicinally to animals prior to slaughter, are apt to give their characteristic odour

to the meat. Chloroform is one such agent, but no information seems to be available as to its effect on " cured products ' such as bacon and hams. With a view to ascertaining what effect chloroform has on the taste and smell of bacon and hams, and in reply to an enquiry as to the possibility of the use of chloroform anæsthesia in pig slaughtering, I recently obtained permission to test the matter on a pig at this factory.

The subject chosen was a cross bred Large White Bacon pig about eight months old, weighing 10 scores 5 lbs. dead. It was decided to anæsthetise the animal, and to slaughter it by " sticking " with a knife in the throat in the ordinary way, whilst under the influence of the anæsthetic. The anæsthetic used was a chloroform and ether mixture (2 parts chloroform to 1 part ether). An anæsthetising mask was made from an empty patent food tin, the bottom of which had been pierced by numerous holes to allow air to circulate freely. A pad of cotton wool was inserted into the " mask," the anæsthetic being poured on to this pad.

The pig was driven quietly into the " hoisting pen," and a rope slipped into its mouth, the noose being over the upper jaw. The loose end of the rope was thrown over an iron rail above the animal, and held firmly by one man, whilst another man kept the pig's hindquarters against the side of the pen. The mask was easily inserted in position over the snout, and a piece of sacking placed over nose and mask, leaving the perforated end of the mask free so as to allow a plentiful admixture of air with the anæsthetic vapour ; this being considered necessary in view of the fact that the animal was of the fat bacon variety. A fat pig is not an ideal subject for a general anæsthetic, and I therefore decided to proceed slowly with the administration. An initial dose of four drachms was administered, and a plentiful supply of air allowed. The animal was given about a minute to inhale the mixture, which it did very quietly, and with no struggling, merely emitting a few squeals and grunts. The mask was then removed and another four drachms of the mixture poured on to the cotton wool, the mask being replaced immediately, with the piece of sacking covering the air holes. The pig was still able to obtain a supply of air, but the concentration of the anæsthetic was now greater. In about 30 seconds the subject passed into the stage of excitement, followed by general anæsthesia, manifested by sinking to the ground.

The mask was retained over the nose, and the body hoisted by means of a shackle on one of the hind legs. The mask was removed as the animal left the ground, and, whilst still unconscious, the throat was cut in the ordinary way. The time taken from placing the mask over the pig's upper jaw, until hanging ready for bleeding, was about five minutes. This time could have been shortened by the adminis-

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tration of a stronger initial dose of the anæsthetic ; but, as the animal was very fat, this was considered too risky.

One ounce of chloroform and ether mixture was used.

The animal bled well, but the blood was rather darker in colour than normal. It was collected, and weighed 6¼ lbs. which is quite good (average from a pig killed in the ordinary way is from 6 lbs. to 6½ lbs.). A strong odour of chloroform was noticeable, being more pronounced after the blood had been allowed to stand in an open pan for about half an hour.

The carcase and offal were then examined. The lungs appeared well drained of blood, and on cutting into them the characteristic odour of chloroform was most pronounced. In the heart, both auricles and ventricles contained dark blood clots with strong chloroform smell, which persisted after opening the cavities and washing them free of blood clots. There was no pronounced odour of chloroform in the stomach or bowels, and as these organs were examined fresh on removal from the carcase, it is possible that their normal odour may have masked that of the chloroform. All organs appeared well drained of blood, and normal to the naked eye.

The carcase, after disembowelling and splitting down the backbone, was carefully examined. The two sides appeared quite normal and well bled. A strong smell of chloroform emanated from the throat region, at the site of the slaughter wound. The kidneys, and beneath the peritoneal fat, were similarly tainted. The head also smelt strongly of chloroform.

Two hours later. The carcase was placed in a favourable position to cool and " set," and on examination two hours after slaughtering the two sides had a most pronounced odour of chloroform, especially noticeable on cutting into any part of the flesh. This was almost like smelling the pure anæsthetic itself.

Twenty-four hours later. The carcase had " set " properly, but the chloroform odour was still more pronounced, and could be distinguished on approaching the two sides. It was unnecessary to cut into the flesh to get it. The lungs, heart and liver also smelt strongly of chloroform.

The head was boiled and a portion tasted. It had a very peculiar, sweet taste, quite unlike ordinary boiled pork.

The hocks, trotters, diaphragm, and trimmings, were all pickled. A strong smell of chloroform was present in all these after pickling.

Ten days later. The two sides were " cured " by the " dry " process, and were ready for examination ten days after slaughtering. Both sides had " cured " nicely, but on cutting into them the odour of chloroform was most pronounced, and could easily be distinguished on inserting the " Trier " (the steel skewer used in testing for " taint ").

Slices of the bacon were fried and tasted. Again the sweet taste of chloroform was most noticeable.

Forty-seven days after slaughter. The two hams were brought out of the curing cellars, and on cutting portions off the surface, as well as by the use of the " trier," the odour of chloroform was quite pronounced The hams were next sent into the drying rooms, and were examined again *seven days later* (i.e. fifty-four days after slaughtering). The hams were cut in halves, and slices cut out and fried. The meat smelt strongly of chloroform, and on tasting the cooked slices the sweet characteristic chloroform taste was unmistakable.

From the foregoing it is apparent that chloroform, administered to a pig prior to slaughtering, will persist in the flesh for at least eight weeks, and that the process of curing and pickling does not seem to affect the drug in the tissues. The hams and sides were cured by the " dry cure " process, and there is no question of them not " taking the salt." Experts here pronounced the " cure " as one of the best they had seen.

ATYPICAL B. PULLORUM INFECTION IN YOUNG CHICKS.

By N. S. BARRON, M.R.C.V.S.,

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In the course of the investigation of an outbreak of disease in young chicks due to B. pullorum, lesions of a well marked and unusual character were met with by the writer. The history of the condition was atypical in several respects.

Those who have had the opportunity of examining large numbers of outbreaks of Bacillary White Diarrhœa in chicks realize how infrequently B. pullorum produces pathological alterations in the bodies of affected birds which can be regarded as definitely diagnostic of the presence of the disease. The history of a typical outbreak, however, reveals a number of facts which are of importance in investigation. It usually shows that deaths commenced to occur almost from the first day of hatching and that they continued well up to the end of the second week, with the heaviest mortality between the eighth and twelfth days. An inquiry into the origin of the eggs laid down frequently affords the clue as to how the disease was introduced on to premises where it had not previously occurred. As the name of the disease implies, one of the commonest symptoms is the occurrence of a whitish diarrhœa, but this is not always a prominent feature in the early stages of an outbreak. Moreover, the droppings may normally

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show some variation in consistency, and as they contain a large proportion of urates secreted from the urinary system, they are of a whitish streaky appearance. A common symptom of B.W.D. is the " pasting up " of the cloaca due to matting of the adjacent down with semi-fluid excreta, but this may also occur in other conditions, as, for example, in coccidiosis and various non-specific intestinal disorders.

In some cases there are no macroscopic lesions to be observed at autopsy, but the following appearances are frequently seen and described, though they are not necessarily indicative of the presence of this desease :—

(1) The Persistence of the Yolk Sac.

For the first seventy two hours of its life the chick lives entirely upon yolk derived from the egg from which it was hatched. This is stored in the abdomen in the yolk sac from which it is gradually absorbed. Normally this structure has disappeared by the fourth or fifth day, although it has not infrequently been found to persist for as long as nine days in the apparent absence of any pathological or bacteriological condition (Schilling and Bleecker[1]). The persistence of the yolk sac in cases of B. pullorum infection has been explained on the supposition that, the condition being septicæmic, the presence of the organism in the yolk sac may bring about changes which retard absorption of its contents.

(2) The Yellowish Streaky Appearance of the Liver.

The liver of very young chicks is normally of a pale yellow colour owing to the presence of absorbed yolk. As absorption of this material declines, the organ takes on a streaky appearance, and when the process has terminated it assumes a mahogany or chocolate colour. The streakiness is not, therefore, in itself an indication of a disease process, and may persist for a longer period than normal as the result of a diminished rate of yolk absorption arising from any cause.

(3) Nodules in the Lungs.

These lesions are not constantly found, but they afford a fairly useful indication of B. pullorum infection. They take the form of rounded, yellowish grey firm nodules, the size of a pin's head, embedded in the lung tissue. The organism can be isolated from these nodules.

History of the Case under Discussion.

The owner had purchased twenty-five valuable Rhode Island Red hens as a nucleus from which to build up a good quality flock. The first two batches of chicks hatched from the eggs of these birds presented no suspicious symptoms and although the total rearing losses

were rather heavy, amounting in all to 18 per cent., the owner was inclined to attribute them largely to the very severe weather experienced during the early spring of this year. The third batch of chicks progressed in much the same way until the sixteenth day, when the mortality suddenly became heavy and ultimately reached a total of over 40 per cent. Before death the birds became mopy, but showed no evidence of diarrhœa.

A *post-mortem* examination of two of these birds was made and the following lesions observed.

In each instance the gizzard, although normal in size and consistency, showed very striking, prominent, discrete, pale yellow, caseous nodules, some being visible superficially and others embedded deeply in the muscular walls. They measured 3-4 mm. in diameter, and were not encapsuled. Similar lesions were also present along the course of the duodenum protruding from beneath the serous coat. They presented a pale yellowish white rounded surface, but were somewhat less prominent than the lesions in the gizzard though rather firmer in consistency. The appearance and distribution of the nodules in the intestine and gizzard reminded one strongly of the picture presented by these organs in some cases of tuberculosis in the fowl. The liver was of normal consistence but showed numerous minute greenish yellow translucent areas scattered throughout its substance. The heart wall in each case presented four or five pale yellow fat-like nodules embedded in its substance and visible superficially. The cæca were slightly dilated and contained somewhat firmer contents than usual. No coccidia or other parasites could be detected.

At a later date a number of chicks were examined from a fourth batch in which the mortality became heavy about the tenth day. Lesions of a similar type were found in these, but they were not developed to the same degree being far less prominent in the heart and liver and not quite so well defined in the gizzard.

Bacteriological Examination.

A pure culture of an organism resembling B. pullorum in its morphological, tinctorial and cultural characters, and in its fermentation reactions was isolated from the heart blood, the nodules in the liver and gizzard, and the bone marrow. An emulsion of the organism prepared soon after isolation was tested with a stock agglutinating B. pullorum serum, but failed to show any reaction. It was not until the strain had reached the fourth generation in artificial culture that it became agglutinable and it was then found to be completely agglutinated up to the titre limit of the serum.

It was decided to carry out a blood test of the twenty five hens

which produced the eggs from which these chicks were hatched, and as a result thirteen of them gave a positive reaction. It was also ascertained that an average of 20 per cent. of fertile eggs had failed to hatch.

The outbreak was of interest as showing a subacute form of B. pullorum infection due, in all probability, to the strain involved being of less than the normal virulence. It would appear that cases of this kind are of somewhat rare occurrence. The only description of a similar condition which we have seen in the literature is a comparatively recent one by Truche and Bauche[2]. These authors describe an outbreak in which deaths occurred in chicks from 10 to 15 days old. The lesions observed were tubercle-like nodules in the lungs, gizzard and heart, from which B. pullorum was readily isolated. The heart blood and cerebral pulp proved to be sterile in the majority of cases.

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Clinical Articles

Contagious Abortion in a Donkey Stud.

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Introduction.

THE Donkey Stud in Mona Remount Depot is maintained for a single object in order to breed Jacks or Donkey Stallions for drafting into the different breeding areas for the purpose of Mule Breeding, and to curtail the expense of importation of foreign Jacks. As far as size and conformation is concerned, the Punjab even so far south as Hissar can breed as good donkeys as anywhere in the world. Some Mule Breeding authorities say that there is no comparison between mule stock got by India Country Breds and imported Jacks (American Catalonians), and that the former get much better stock. Country Bred Jacks are slow " coverers," but nearly all do " cover " if persisted with, and the majority are good stock getters.

The imported American Jacks get a large proportion of mules which are difficult to place, as they are inclined to be big and leggy and

light of girth. The country bred Jacks get a number too small for Mountain Batteries, but they can be classified as Army Transport, etc., and there is always a large demand in India outside the Army for small mules, but none for big. I do not think contagious abortion in a donkey stud an insuperable difficulty. One naturally gets losses but donkeys breed readily, and one can generally obtain a good percentage of normal foals in spite of the disease.

History.

The stud was started in 1904, and reached its authorised number of 80 mares during 1906.

Mares were purchased from ten centres, which included the Punjab, Baluchistan, and North-Western Frontier provinces.

Thirty-two mares were received in-foal.

The purchasing of such a large number of full aged mares from so many centres in different districts and provinces, a large proportion in-foal, and some probably barren or recently aborted was in my opinion a dangerous procedure. The disease has now been proved to be widespread in parts of India, in particular Northern India. I know of at least seven studs in the Punjab where the disease has existed. In 1925 the strength of mares at the stud was reduced to 50. Replacements in the stud are maintained by stud-bred fillies. The stud was grazed over large areas of permanent pasture from the start of the stud until 1916. There were 19 abortions and 22 full-time born dead foals during 1914-15. The disease, I am justified in saying, obtained a foothold in the stud during 1907. The stud was split up into three parts during January, 1927. The results of agglutination tests carried out by the Director of Imperial Institute of Veterinary Research, Muktesar (India), revealed the fact that the stud was heavily infected (*Vide* Table No. 5).

The Agglutination Test.

This is of practical value for the following reasons :—

1. It establishes a diagnosis of infection in a stud.
2. Determines extent of infection in that stud.
3. Testing animals to be added to clean stud.
4. Dividing stud into suspicious, reacting or infected, and a clean stud.

The test may not pick out recently infected animals. A reaction to the test does not mean that an animal has aborted, or that it will eventually abort. Animals may abort if agglutination titre is low. Abortion may take place before full complement of agglutins are in the

blood. All supposedly clean animals should be re-treated after six months to one year. All animals negative to the first test should be re-tested after about three months.

Case Histories.

A review of the first five mares which entered the stud is of interest:—

Mare No. 1.—Had been empty in 1904 and 1905. Aborted on 29.7.07 after 8 months.

Mare No. 2.—Received in stud during 1903. Colt born on 2.5.05, died after three days. Aborted on 26.5.07 after ten months. Aborted on 14.6.09 under 5 months. Filly and Colt (twins) born on 2.11.10. Filly died after six hours, colt after one day.

Mare No. 3.—Empty from 1904 to 1906. After 1906 aborted three times. One full-time dead foal, one under 6 months, and one under 9 months. Living foal was born on 1906, and was afterwards empty six times in one year.

Mare No. $\frac{1}{8}$.—Aborted in 1907 after ten months. Full-time dead foal born in 1915. Living foals in 1905, 1906, 1909, 1910 and 1912. Was empty eleven times in 10 years (1904 to 1914).

Mare No. 5.—Was eight years of age when received in stud on 22.3.04. Had been empty for three years. Was not covered for one year (1908). Was kept in stud for four years and on the 3.3.08 was destroyed on account of suffering from chronic endo-metritis. This mare, in my opinion, was a barren mare at time of purchase, and in every likelihood a " carrier " of the disease. Muktesar researches indicate that animals may " carry " infection for two or three years or longer ; sometimes they then become clean ; and instances are on record of these animals becoming reinfected again.

Webb in " Abortion in a Donkey Stud," *Journal of Comparative Pathology and Therapeutics*, Vol. xxii, No. 4, 31st December, 1909, p. 289, lays the blame of starting the disease on mare No. 84.

Mare No. 6.—Was six years of age when purchased on the 18.2.07. Received in-foal. Aborted 7.5.07, at about seven months. Aborted 8.4.09 after five months. A colt died five days after foaling on 6.7.10. Foaled a living filly on 27.8.08. Living foals—seven. Empty 14 times. Destroyed on the 4.11.17.

Maintenance of Stud.

All donkeys in the stud, mares, colts and fillies are stationary in dry paddocks but are removed to foaling boxes about two weeks before expected time of foaling. Mares which are going to abort

usually show the following premonitory symptoms :—They are dull for about two hours previous to aborting and then show colicky symptoms for a half hour or so. They abort as a rule under three hours. The process seems to be a sudden one, evidently on account of the chorion coming away so easily in mares. The health of the donkey mare does not seem to be in the least impaired.

With mares which are fed in dry paddocks, the conditions are not favourable for intensification and massive spread of the infection. The disease however remains latent, which has been proved to be the case in Mona Stud as the results of the numerous agglutination tests. A large proportion were found to be infected (*Vide* Table No. 2). Transmission in the Mona Stud is by small quantities of infected material, and there is not much exaltation. The casual organisms evidently remain fairly stationary as regards virulence although over a period of years there are fluctuations and a serious tendency to spread the intensity in virulence during some years causing formidable losses to the breeding operations (*Vide* Table No. 1). The infection has now persisted in the stud for twenty-five years, and abortions have increased for a period of two to four years in virulence until it became serious, when full-time dead foals were included (*Vide* Table No. 1). There appears to be a fairly well defined periodicity in intensification in virulence of the disease.

Cause.

What is the cause of this enzooticity ?—The disease spreads by ingestion, and the factors are a massive infection at times. The existing conditions are evidently favourable for exaltation of the chief causal organisms at times (*Vide* Table No. 1).

Bacteriological Results.

Bacteriological examination of material from aborted fœtuses, and full-time dead foals by Muktesar were as follows :—

Heart blood swab, heart blood and stomach contents pipettes of the aborted fœtus, or full-time dead foal are forwarded for bacteriological examination. Twenty-two examinations have been carried out to date, and three are at present under report which were despatched during May, 1929. Collectively speaking the chief causal organisms are the B. Abortivo equinus as well as other organisms belonging apparently to the colon paratyphoid group. Some showed a definitely positive result in that B. Abortivo equinus was isolated in culture. In some the results were not so clearly defined, in that

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Coliform organisms were also present in culture. The Coliform organisms may conceivably have been the actual cause of the abortion, inducing resuscitation of B. Abortivo equinus. Other causal or extraneous or secondary invaders have been demonstrated.

B. Subtitis, Streptococci, Staphylococcus aureus, albus and citreus, B. proteus, Escherichia acidi lactici, Coliform organisms of the genus Flavo-bacterium, Sarcinæ, Diphtheroid organisms, Coliform organism of genus Eberthella, and B. alcaligenes were isolated in mixed growths. These results are almost valueless as it is impossible to interpret the results as either positive or negative. The B. Coli are evidently exalted bowel saprophytes by passage. Streptococcus (S. fæcialis) are also exalted saprophytes. The B. Abortivo equinus belongs to a peculiar group of coliform organisms known as Salmonella. It is connected with the food poisoning group of organisms. They all produce very powerful toxins. The organism is identical in all particulars with that found in America and Europe.

Vaccination.

Wholesale vaccination by the subcutaneous inoculation of cultures of the causal organisms (B. Abortivo equinus cum B. Coli) killed by heat was adopted during the past Covering Season (1928-29) in place of the " wearing out ' process.

The chances of setting up a useful immunity against the common form of equine contagious abortion seem to be considerable, especially as all strains of B. Abortivo equinus examinations by Muktesar would appear to have fallen within a single seriological group. Vaccination directions as issued by Muktesar :—

10 c.c. to be injected as follows :—

1st injection	first after serving	....	1 c.c.
2nd ,,	one month after	....	2 c.c.
3rd ,,	3 months ,,	....	3 c.c.
4th ,,	5 ,, ,,	....	4 c.c.

Each dose to be injected subcutaneously at side of neck.

If incidence of the disease is very heavy and severe, dose given at 4th injection may be repeated at the 7th month and again, perhaps at the 9th month. All donkey mares served in the Mona Stud have received six injections. The results of one year's vaccination will be seen in Table No. 2 as compared with two non-vaccination years. The results of last covering season are not as hopeful as was expected. It is, however, being given another season's trial. Vaccination has failed in some instances against the homologous specific infection.

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Stallion as Disseminator of Infection.

The stallion has been said to sometimes spread the disease. Some German workers say that he can spread the disease. The relation to the spread of the disease probably depends to a large extent upon whether he is infected or not (*Vide* Table No. 2). It is said that abortion cannot be produced by introduction of organisms per vaginum (Schroeder's experiments). What is the channel of infection in the stallion, and what percentage ejaculate B. Abortus equinus with the semen? These points have not yet been conclusively determined. In the outbreak at Government Cattle Farm, Hissar (South Punjab), Doyle says that there is no evidence pointing to the stallion as a disseminator of the disease.

Period of Incubation.

The incubation period on an average is in donkey mares nineteen days following experimental infection (Doyle). Branford and Doyle say that it may extend to six weeks in natural infection.

Table No. 1.

PERCENTAGE RESULTS OF COVERINGS.

Financial Years (1st April to 31st March).	Normal Foals.	Abortions.	Total.	Full-time Dead Foals and Mares died in Foal.	Sum Total.
1904–5	50.0	—	50.0	50.0	100.0
1905–6	57.14	—	57.14	—	57.14
1906–7	83.8	—	83.8	2.6	86.4
1907–8	24.2	16.6	40.8	28.8	69.6
1908–9	48.0	10.67	58.67	16.0	74.6
1909–10	45.6	13.9	59.5	6.3	65.8
1910–11	56.7	18.9	75.6	10.8	86.4
1911–12	57.4	4.4	61.8	2.9	81.0
1912–13	54.0	8.1	62.1	18.9	81.0
1913–14	60.0	7.6	67.6	7.6	75.2
1914–15	42.5	10.0	52.5	13.7	66.2
1915–16	33.3	21.2	54.5	25.5	80.0
1916–17	50.0	18.7	68.75	3.75	72.5
1917–18	51.7	15.3	67.0	9.4	76.4
1918–19	52.9	9.2	62.1	10.3	72.4
1919–20	67.9	2.6	70.5	7.7	78.2
1920–21	59.7	10.9	70.6	9.8	80.4
1921–22	46.4	13.1	59.5	10.7	70.2
1922–23	52.4	13.4	65.8	11.0	76.8
1923–24	36.4	7.5	43.9	12.1	56.0
1924–25	63.7	6.2	69.9	7.5	77.4
1925–26	51.9	11.7	63.6	14.3	77.9
1926–27	32.7	14.5	47.2	7.3	54.5
1927–28	60.0	8.0	68.0	10.0	78.0
1928–29	56.81	6.81	63.62	6.81	70.4

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Table No. 2.

AGGLUTINATION TESTS DURING 1925-26.

Animals Tested.	Carried out by Muktesar.					Negative.	Total No. of Testings.	Total No. of Animals Tested.
	Undoubtedly Infected.	Infected but less marked.	Suspicious.	Suspicious, but less marked.	Slight reaction.			
Donkey Mares	39	5	22	14	38	32	150	54
Donkey Fillies	8	—	8	6	15	41	78	65
Donkey Stallions	8	1	3	3	2	—	17	9
T. P. Mares ..	5	—	3	1	7	8	24	11
Sum Total	60	6	36	24	62	81	269	139

Immunity.

Is not so durable in the mare as in the cow, and not so readily acquired.

Joint-ill.

During the past three years (1926 to 1929) I have not seen a case of joint-ill associated with specific abortion in the stud. Doyle failed to set up joint-ill in foals either by intravenous or alimentary infection. Intravenous inoculation of the organisms produced arthritis in three adult animals (two pony mares and one donkey stallion) (Doyle).

Summary.

1. Mona Donkey Stud is maintained for the single purpose of breeding Jacks, in order to reduce the number of imported jacks. The Indian C.B. jack has got size, weight and good conformation. He is a slow coverer, but a good stock-getter

2. Mona Donkey Stud dates from 1903. Full complement of mares (80) was reached during 1906. Present strength of mares is 50.

3. The disease is widely spread in parts of India.

Tested.

Table No. 3.

STATEMENT SHOWING COVERING SEASONS AND FINANCIAL YEARS FOR THE PAST THREE YEARS IN DONKEY STUD, REMOUNT DEPOT, MONA.

	No. of Full-time Foals Living.	No. of Abortion 6-8 months.	No. Born Dead Full-time.	Mares Cast and Sold in-foal.	Mares Died in-foal.	Mares Strayed in-foal.	Empty.	Total No. of Foals.	Total Abortion and Born Dead Full-time.	Foaling percentage.	Percentage of Abortion and Born Dead Full-time.	No. of Coverings.	Remarks.
1926-7 Covering Season	18	9	4	—	2	—	28	33	13	54.09	39.39	61	
Financial Year.	18	8	2	—	2	—	25	30	10	54.55	33.3	55	Financial Year—1st April to 31st March.
1927-28 Covering Season	25	2	3	2	1	1	12	34	5	73.91	14.70	46	Covering Season—1st March to 28th February.
Financial Year.	25	4	4	3	1	1	11	39	8	78.0	20.5	50	Three cast and sold, one strayed and (3) three died, all were in-foal and are included in this statement.
1928-29 Covering Season	27	5*	3	1	—	—	15	36	8	70.58	22.22	51	
Financial Year	25	3*	3*	—	—	—	13	31	6	70.45	19.35	44	* One positive to B. Abortus equinus. Eight negative to B. Abortus equinus. All mares at Stud throughout 1928-29 were vaccinated.

4. Agglutination tests (269) showed that the stud was heavily infected (*Vide* Table No. 2).

5. Probable cause of introduction of infection into the stud was mare No. 5. On purchase in 1904, she was barren, and a " carrier."

6. All mares and young stock are kept in " dry " paddocks and have not been grazed since 1926. Mares foal-down in foaling boxes.

7. The disease exists in a latent form. Transmission is by small quantities of infected material, and there is not marked exaltation. Causal organisms remain fairly stationary as regard virulence. Over a period of many years (1904 to 1929) there are fluctuations, and a tendency to spread and intensify in virulence some years.

8. Infection has been in stud for 25 years.

9. The chief causal organisms are the B. Abortivo equinus and other organisms belonging to the colon paratyphoid group.

10. Vaccination has been practised on all mares covered in stud during 1928-29 covering season (*Vide* Table No. 3).

11. All Jacks subjected to agglutination test showed certain degrees of reaction (*Vide* Table No. 2).

Appreciation.

I wish to thank Dr. Edwards, D.Sc., M.R.C.V.S., the late Director of Imperial Institute of Veterinary Research, Muktesar (India), in particular, and his staff in general for the ungrudging help and advice they have given me during the three past years in connection with contagious abortion in the Mona Donkey Stud. The number of agglutination tests, bacteriological examinations, and preparation of vaccines entailed a considerable amount of special technique work.

REFERENCES.

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(2) Branford and Doyle. " Notes on Contagious Abortion in Pony and Donkey Mares," *Pusa Research Institute Bulletin*, No. 121 (1921).

(3) Doyle, T. M. " Etiology of Equine Contagious Abortion," *Pusa Research Institute Bulletin*, No. 5, Vol. 111, October, 1922.

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Retention of Fœtal Membranes after Birth of Twin Calves. Left Uterine Horn Clean, Right Horn Unclean.

By HUGH BEGG, F.R.C.V.S.,

County and District Veterinary Inspector, County Offices, Hamilton.

Of all the cows from which I have removed, or attempted to remove, the retained fœtal membranes I cannot recall a case exactly similar to that which I now relate. I recollect, however, that Messrs. McFadyean and Stockman put on record a twin pregnancy in which one horn was apparently normal while the other contained a large quantity of exudate.

The subject was a four years old pedigreed Ayrshire cow at her second pregnancy, and a member of a herd in which abortion appeared two years before, most of the cows being vaccinated for two consecutive years.

It was reported by the attendant that the cow had gone two days past her time as reckoned in these parts, where the period of gestation is expected to extend from eight to sixteen days beyond the estimated day. The animal, therefore, had calved a little prematurely, and the appearance of the retained membranes and the uterine exudate were characteristic of contagious abortion.

I examined her forty-eight hours after calving, and was informed that very little of the membranes had been extruded. The hand passed readily through a wide os into an apparently single large cavity, the complete length of which I failed to explore with my arm bare to the shoulder. The cavity contained almost no exudate and only a few loose shreds of unattached placental membrane. I irrigated the cavity with two gallons of weak disinfectant solution which the cow readily voided with little discolouration, though curiously this was followed by some typical concentrated exudate. Exploring again, it was found that this (the left horn) cavity contained almost no fluid. The attendant still maintained that there could be no mistake that the cow had only parted with very little of her cleansing. Wishing to induce uterine contraction, I injected two gallons of lukewarm water into the cavity, and this was very soon returned almost unchanged, though followed as before by some characteristic uterine discharge. Exploring the cleansed cavity, one could feel on the mucosa of the posterior part protuberances to the number of about eighteen, which undoubtedly marked the sites for cotyledons, but so small that they could not have held cotyledons that had functioned for one of the two calves born dead forty-eight hours before. The mucosa of the anterior two-thirds of the cavity was as severely plain on all sides as

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the wall of the rumen, which could be felt on the left. Withdrawing my hand from this clean horn it was filled with exudate when near to the os uteri. Palpating the right wall of the os in order to explore for the entrance to the other horn, which I had not yet been able to enter, I found that what at first seemed solid wall tissue was separable, and with the fingers I pulled to the left a heavy upright partition with a thin posterior border, the edge of which was as near as three inches to the external opening of the os. The hand and arm then entered the right horn, which contained the macerated membranes and a large quantity of typical discharge. I dealt with this as best I could for a time, but lack of reach hindered a satisfactory completion of the job.

Although the cow's temperature was 104.3°, there was such evidence of increased tonicity of the uterine walls while I was operating that I was hopeful regarding the case. Forty-eight hours later the temperature was 101.6°, and it was not possible to insert the hand through the os, but discharge was issuing freely. Examining my soiled hand, it was seen that the dirty discharge was plentifully mixed with tenacious gelatinous material, which webbed the fingers when the hand was spread out. I have always regarded the presence of this material as of salutary significance. It is always absent, in my experience, when the case develops into one of septic metritis. Nevertheless, within a few days signs of sapræmia were present, all four limbs being rounded and swollen to well above the hocks and knees. She was treated with Salol pessaries, and though she lost some condition for a time she was put back in the herd after six weeks clean-limbed and yielding three and a half gallons of milk daily. She never came into season again, and was fattened off.

I suppose it is likely that both of the twins, which were of fair size, were nourished from the right horn of the uterus, and that the left horn was occupied to some extent by one of the fœtuses.

Arsenical Poisoning in the Field.

By U. F. POLLOCK, M.R.C.V.S.,
Department of Agriculture, New South Wales.

THE subject matter of this paper has been acquired as the result of personal investigation of cases encountered in the Tick Quarantine Area of New South Wales during the last 18 months.

In considering the question of arsenical poisoning, the matter of degree merits the closest investigation, and one is severely handicapped in the case of cattle, which are necessarily dumb, while an account of

all the reactions experienced by a human may be obtained from the patient and very materially aid in diagnosis, besides adding, perhaps, to pre-existing knowledge on the subject. Thus, in cases of arsenical poisoning not attended with fatal results, one has only the often obscure outward signs to go on, evidence so applicable to other conditions that a positive diagnosis cannot be made with any degree of certainty. In such instances, one can resort to testing samples of urine ; this I hope to adopt as a routine procedure in future.

Here is room for research, since all cattle submitted to dipping absorb a certain quantity of arsenic from the dip-fluid, and the analyst will need to determine from a series of experiments what constitutes a normal amount of arsenic in a dipped beast, before the analysis figures of a suspected case of poisoning hold any significance.

Stockowners have told me of cases in the past where beasts showed ill-effects soon after dipping and gradually pined away. Such cases, when reported, are now personally investigated and a *post-mortem* examination held. Where a beast had lingered for upwards of three weeks, it is perhaps possible that, as in man, arsenic will not invariably be found in viscera or tissues, but one can expect arsenic to be demonstrable in urine for about 12 days following its ingestion. This paper will, therefore, treat mainly of Arsenical Poisoning attended with fatal results.

Cause.

My experience to date has pointed to the ingestion or inhibition of the mineral as being directly causal. The beast, while immersed in the dip-bath, drinks some dip mixture or licks up concentrate solution which has been spilled on the ground.

Many proprietary weed-killers, of course, contain arsenic in varying proportion and combination and these, through careless handling, are at times responsible for fatalities amongst stock.

It has been suggested that death may result from spraying a beast with arsenical solution, arsenical poisoning being set up by absorption of arsenic cutaneously. This is very questionable with strengths ordinarily used for treatment of stock. That fatal poisoning can occur from absorption through healthy skin I have no evidence, though death has occurred from exhaustion consequent on severe dermatitis (commonly called " scalding ") set up through treating stock with arsenical fluids.

It is recognised that poisoning may result from application of arsenic to a wound or tumour, but the channel of entry into the system is here quite different, as the natural resistance of the animal's skin has not to be overcome.

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One authority, speaking of sheep, says that arsenic is not absorbed through the healthy skin, but, as far as cattle are concerned, this is false, as it is now well known that arsenic is absorbed into the circulation following on its application in solution to the skin. The question as to whether sufficient can be absorbed as to cause death is to some extent dependant on the strength of the solution applied, but it is a reasonable assumption that solutions up to a certain strength will not cause fatal poisoning through cutaneous absorption, and that solutions beyond a certain strength will occasion a dermatitis in itself sufficient to account for the cause of death.

Adverse weather conditions and fatigue, when associated with dipping of cattle, are definite factors in the causation of mortality.

There is no doubt that immersion in an arsenical fluid renders cattle more susceptible to the effects of heat, especially of the humid type, and renders them less able to withstand the fatigue of travel. When cattle are overheated or pushed along under trying weather conditions, deaths are apt to occur from the combined factors of heat fatigue and dipping.

In estimating the cause of death in such cases, quantitive analyses of viscera and organs are carried out by the Board's Analyst, Mr. Cohen, employing a system which will demonstrate the presence of arsenic in quantities down to 1/1000th grain.

The essentiality of this procedure is appreciated here, as one has to weigh the pathological changes noted in *post-mortem*, and estimate just how much one condition influenced the other, and what actually caused death ; his finding thus weighs the evidence, and permits of a definite decision.

Inflammation has been noted in lung, stomach and bowel which, were the history of the case unobtainable or at fault, might have been considered to have resulted directly from inhibition of arsenic. When however, a quantitive analysis yields arsenic to the extent of merely 1/250th grain per lb. tissue, the mineral can hardly be regarded as other than associated with the ultimate cause of death.

Symptoms.

Various symptoms, such as purging, vomition, colic, etc., have been given by text books as symptomatic of arsenical poisoning, but the trouble is that such features are by no means diagnostic and might also be due to other mineral and plant poisonings, while in a proportion of cases they are definitely absent.

Scouring, as a rule, is in evidence, varying from simple purging to violent muco-hæmorrhagic discharge. In some cases of fairly acute nature it was absent.

Colic, or evidence of pain, is commonly reported by the owner. One might sum up his evidence by saying that, following dipping, the cow became " dopey," went off her milk and hung about, disinclined to feed ; later, found dead.

Abnormal thirst is a symptom fairly frequently noted.

Coldness of the extremities is also noted in some cases. In one instance, amongst some 30 animals of a herd of 70, a large œdematous swelling appeared, involving the abdomen along the middle line. Some of these rivalled the udder in size, but various sizes in a downward grade were noted. They occupied various positions between the udder and brisket and were first noted on the day following dipping, an increase in size taking place up to the fourth day, after which they started to subside. Seven days later an Inspector noted six cases ; on the eighth day I myself saw two. The swelling on one was the size of half a football and pitted on pressure. Loss of appetite was not an accompanying feature, nor was milk yield lost. Whether the condition resulted from the action of arsenic or not, I was unable to determine.

It is exceptional for me to examine a beast sooner than two days following dipping, owing to delay in reporting the case and time necessarily lost in travelling to the holding. Often, the animal is dead or *in extremis* when I arrive.

As to how long an animal survives following the fatal intaking of arsenic, death generally supervenes in from one to seven days, symptoms being in evidence where the beast survives the first day. I have never known a beast under continual observation to be apparently normal for two or more days, and then suddenly succumb.

Dosage.

In the majority of cases it is impossible to gauge the exact quantity of fluid imbibed, other than by an estimate based on a quantitive analysis of tissue. It has been estimated, however, that a quart of arsenical solution containing, approximately, 32 grains of sodium arsenite will cause death inside 48 hours in the majority of cases. It is possible that 20 to 30 grains would serve as a lethal dose. The minimum lethal dose varies, of course, according to the degree of solubility of the agent and the rate of absorption.

The solubility of the Departmental dip-fluid remains constant, but the quantity of ingesta in the alimentary tract naturally influences the rate of absorption so that a dose which would cause death, if coincident with an empty condition of the stomach and bowels, would not necessarily prove fatal were the animal carrying a full feed.

XUM

Antidotal Treatment.

Antidotal measures are adopted when indicated and where possible A supply of antidote is kept at each dip shed for use in emergency.

If a beast is seen to have drunk any spray mixture or dip solution, our inspectors have instructions to immediately make up the antidotal mixture and administer it. The latter consists of solutions of Liquor Ferri Perchloridi and Magnesium Hydroxide in separate bottles. When needed these are mixed with the addition of water and the solution is then ready for immediate use.

The cases which terminate fatally are generally discovered too late to permit of the effective use of antidote. I have, however, used it with success in one case where the inhibition of a lethal dose was highly probable.

Post-Mortem Appearances.

The skin is generally normal ; in only one case have I noted any departure, and the latter was limited to scurfiness along one side of the neck, loss of hair and toughening of the skin around one eye, which latter was possibly caused by prolonged contact with the ground when the animal was recumbent.

It is in the abomasum and duodenum that I look for characteristic change, and, following these, the rumen. In a typical case there is intense diffuse inflammation of abomasal mucous membrane, which is more or less continued in the duodenum for a varying length ; ulceration has been found affecting the abomasum in one case. A glairy, somewhat mucous discharge is also sometimes encountered here. The mucous membrane of the rumen may be cast off in places, displaying intense inflammation in the sub-mucous structures. If still adherent, it may be scraped off with the back of the knife even where the villæ are biggest, when the same inflammation will be apparent underneath.

Sometimes the reticulum and omasum are involved, but, as a rule, not to nearly the same extent. The inflamed tissues throughout assume a port wine colour of varying shades.

The bowels, apart from that part already mentioned, may display inflammation at intervals along their length, but are, as a rule, not very visibly affected.

The liver displays change, but not invariably in acute cases ; it has been found paler than normal, yellowish, distinctly yellow, and highly mottled (red and yellowish-brown) throughout its substance.

Dark hæmorrhagic areas, from pin-head to shilling in size, have been found in the heart, under the endocardium of the ventricles.

The kidneys may show congestion, but I have never found it pronounced.

XUM

Other lesions are absent, or imperceptible.

One thing that has struck me forcibly is the volume of food often found in the stomachs, which, from its appearance, must have been ingested when internal inflammation was at an advanced stage and, one would suppose, extremely painful.

Diagnosis

It was soon borne in on me that the history of the case enters very largely into *ante-mortem* diagnosis, whilst in cases of a sub-acute nature a recourse to chemical analysis is very desirable, and imperative where the history is at all confused.

It is a Departmental ruling that in cases where claims for compensation enter in, organic specimens must be submitted for determination of arsenic's presence in the tissues. As this latter work is carried out on the spot by Mr. Cohen, close co-operation is maintained between field and laboratory staff, and much valuable information readily obtained regarding the degree to which arsenic was cause. Diagnosis is, as already stated, mostly on *post-mortem* appearances.

The history of the illness is most often associated with dipping or arsenical fluid; in fact, now that compensation is paid for losses arising through dipping, all sorts of maladies—occurring within several weeks of dipping—are automatically attributed to that process, in the hope of pecuniary gain.

This brings up another consideration, viz. The Influence of Arsenic on Existing Disease. Where an animal is affected with disease, such as T.B., it may succumb soon after immersion.

Other cases, attributed by owners to Arsenical poisoning, have proved, on *post-mortem* examination, to be acute peritonitis, internal hæmorrhage and pernicious anæmia, but no connection was established here with the former.

In summarising, one can state that to diagnose arsenical poisoning *ante-mortem*, definite symptoms must be in evidence, backed by a history of access or possible access to the mineral.

For a positive *post-mortem* diagnosis, one must find some of the pathological changes before-mentioned, or demonstrate the presence of arsenic in sufficient quantity to warrant the assumption that death was due to arsenical poisoning.

Hypertrophic Nephritis.

By C. W. CARTWRIGHT, M.R.C.V.S.,
Dyserth, Flints.

CHRONIC renal disease in cattle probably occurs with greater frequency than is generally realised, and it is only when the condition

becomes acute or when secondary changes occur that its presence is detected.

SUBJECT. A fine aged Shorthorn cow in good condition was stated to be unwell for 2 or 3 days, though not regarded as serious as she continued to eat and chew her cud. On examination found her grunting a little at intervals, particularly on moving; temperature 102°; mucous membranes slightly icteric, and a rather weak pulse of 80. Dung normal in colour and consistency, also urine clear in colour and passed without difficulty. On the right side in the hollow of the flank just behind the last rib an enlargement could be felt, pressure on which caused pain and the same applied to percussion over the liver. Per rectum both kidneys could be felt tremendously enlarged and the right in particular was very tender to the touch.

Next day cow much worse, weaker, temperature 105°, breathing heavily, anxious expression, and at that time having a very severe rigour, in fact, shaking all over.

For the first time the membranes were markedly icteric with fæces—urine of a very bright yellow colour. The owner, a very old man, insisted on treatment as she was an old favourite, so palliative measures were adopted. Two days later she became unable to rise, so he consented to slaughter.

Post-mortem examination showed both kidneys to be enormously enlarged, particularly the right, which had apparently torn itself from its attachments and was lying partially free and pressing directly on the liver—this pressure far exceeding the normal. Extensive hæmorrhage had occurred under its capsule, the layer of coagulated blood varying from 3 to 5 inches in depth. The kidney measured 16 by 10 inches, and though no facilities were available for weighing, it was estimated to be of at least 20 lbs. weight. The left kidney was less and showed no subcapsular hæmorrhage.

No abscess or pus foci were present and on section the parenchyma was firm and dense, appearing to consist largely of fibrous connective tissue. The liver with the exception of a very small sound area was soft, friable, and showed extensive fatty degeneration. In view of the above I attributed a nasty fall which this cow sustained the evening before her illness as the exciting cause of the acute condition, for prior to that she was apparently in good health and certainly in good condition.

Acute Eczema in Cattle Affecting only the Unpigmented Skin (the White Haired Parts of the Body).

By J. W. HALL MASHETER, M.R.C.V.S.,
Newnham-on-Severn.

THIS, to me, is an extremely rare occurrence in cattle; in fact, in 36 years of practice, I have only seen one case and that occurred on 24/6/29, when I was called in to a second calf Friesian cow.

Symptoms.

The oncoming of the symptoms was very acute.

The cow, a dry cow in calf, was all right when turned out with the herd after milking, but before noon was noticed to be amiss, showing symptoms of colic—kicking abdomen with hind legs, throwing herself to the ground, and lying there prostrate for a time—rumen bloated—neck stretched out and showing severe dyspnœa.

I found on arrival all these symptoms together with a temperature of 105° F.—inability to stand, hair on hind quarters (*white parts only*), staring.

On passing my hand over these parts, they felt "rough," and wherever my hand touched this was followed by a copious effusion of serum. Udder, which was entirely unpigmented, was tense and shining and the skin felt thick.

TREATMENT.

Purgatives (aloes) followed by sedatives and digestive tonics.

The cow was practically convalescent on the 28th, but had lost a lot of condition. On this day she gave birth prematurely (3 weeks) to a live calf. Placenta was retained which was manually removed 30/6/29.

Disquamation of the parts affected was beginning, and was practically complete by 9/7/29, leaving the skin denuded of hair, smooth and glistening.

Only the *white* parts of both hind quarters up to the umbelicus and the corresponding part of the dorsal region were affected; the line of demarcation between the white and black parts of the skin being very distinctly delineated.

This case, showing such unusual symptoms, and the acute differentiation of the black and white areas of the parts affected puzzled me, although I remembered reading of this occurrence in the *Veterinary Record* some time ago, but, as usual, when one wants to find a particular case, it could not be found.

XUM

I then ransacked *The Encyclopædia of Veterinary Medicine and Surgery* and found, not any reference to cattle, but—" in horses a peculiar form (of eczema) is often met with affecting the *white skin* of the legs and face, and *frequently limited to those areas* in the particular patient " and " it is not uncommon for eczema to affect *white* legs or *white patches of skin* in horses.

" It has often been stated that the lesion in such cases is often due to too frequent washing and imperfect drying of the skin, but in the writer's view this is by no means the only or principal cause of the condition.

" He has frequently observed it affecting *white patches on the body* which have not been subjected to washing, and he has also frequently seen it occurring in a *single white leg* which has not been subjected to any different treatment or management from its fellows.

" He is of the opinion that the lesion in such cases is more likely to be due to a *tropho-neurosis.*

(Trophic [τρέφω—I nourish] is a term applied to the influence that nerves exert with regard to the healthiness and nourishment of the parts to which they run. When the nerves become diseased or injured this influence is lost and the muscles waste, while the skin loses its healthy appearance and is liable to break down in ulcers.)

Pursuing my investigation of this condition, I turned to *Special Pathology and Therapeutics, Hutyra and Marek*, Vol. III, 3rd edition, and found that the condition was mentioned under " Eczema of Cattle."

Although my case did not occur under the dirty conditions they mention—the cow was out at grass during the recent hot, dry weather, and was perfectly clean so far as bodily cleanliness was concerned —they agree that " acute " eczema occurs only rarely in cattle.

They quote Mégnin who saw a recurrent eczema which had existed in a cow for three years—it began in the region of the loins with the development of little vesicles . . . finally the greater part of the upper portion of the body was attacked, although the affection was *limited exclusively to the unpigmented parts* of the skin. Also Mouroux observed a similar trouble in *spotted cattle*, which, however, began with general disturbances (loss of appetite, cessation of rumination, constipation and moderate tympany) as well as emaciation ; *it attacked only the unpigmented parts of the skin* and persisted only during the warm part of the year, from May to October. The hair grew again later on in four-fifths of the cases.

This latter report coinciding fairly exactly with the case which

came under my notice convinced me that what I had to deal with was a case of acute eczema, and I have reported this, together with the remarks of Wooldridge (in horses), Mégnin and Mouroux.

It may, as Wooldridge states, be due to tropho-neurosis, and in this case tropho-neurosis of the lumbar plexus.

On the other hand it may, from its sharp onset be due to digestive disturbance, which incidentally may be easily argued back to tropho-neurosis, and in all probability rightly so.

News

National Dog Week and the Royal Veterinary College.

LAST year saw the initiation of two ideas, a National Dog Week and a Tail-Waggers Club, each instituted to help that friend and companion of man, the dog ; by educating his owner how to feed and otherwise treat him hygienically, and thus make his life happier and better.

Each idea emanated originally from the fertile brain of Capt. Hobbs, a well-known dog lover, who gathered around himself a few energetic friends and formed the National Dog Week Scheme with the Right Hon. the Earl of Chesterfield, K.G., as President, and Professor Hobday, C.M.G., F.R.C.V.S., the Principal of the Royal Veterinary College, as Chairman of the Executive Council. The Vice-Presidents include such well-known names as :—The Most Hon. The Marquis and Marchioness of Exeter ; The Most Hon. The Marchioness of Winchester ; The Rt. Hon. The Earl of Airlie, M.C. ; The Rt. Hon. Lord Daresbury, C.V.O. ; The Rt. Hon. Lord Harlech, C.B., T.D. ; The Rt. Hon. Lord Mildmay of Flete ; The Rt. Hon. Lorna Countess Howe ; Lady Harlech, J.P. ; Lady Seaforth, C.B.E. ; The Hon. Lady Ravensdale ; The Hon. Lady Burton ; Lady Kathleen Pilkington; Maj.-Gen. Sir John Moore, K.C.M.G., C.B., F.R.C.V.S. ; Sir Archibald Weigall, K.C.M.G. ; Brigadier-General Malcolm O. Little, C.B.E. ; Lt.-Col. The Hon. S. Pleydell-Bouverie, D.S.O., T.D., O.B.E. ; Lt.-Col. E. W. Stanyforth, C.B. ; Lt.-Col. Sir Merrik R. Burrell, Bart., C.B., C.B.E. ; Theo. Marples, Esq. (*Our Dogs*) ; Mrs. Phyllis Robson (*Dog World*) ; A. Croxton Smith, Esq., O.B.E. ; Lt.-Col. M. W. Douglas, C.S.I., C.I.E., *Secretary*, Our Dumb Friends League ; A. Cornish-Bowden, Esq., M.R.C.V.S. ; Mrs. Carlo Clarke and Mrs. F. Colman.

That both Schemes have been a success is shown by the fact that the second year's National Dog Week is now arranged for ; and between the dates of September 22nd and the 28th, thousands of willing helpers will be assisting the cause of the dog all over England in all

kinds of ways and by all kinds of schemes. Dog shows, lectures, and other means of propaganda in all places. Full information for these can be obtained from the Secretary (Capt. Hobbs), 37, Temple Chambers, Temple Avenue, London, E.C.4. and literature will gladly be sent on application.

To join the Tail-Waggers Club (which forms a very useful insurance for regaining a lost dog) the fee is only 2/-, and already there is a membership of over 130,000. Recently they have been recruiting at the rate of over 1,000 a day.

The money thus raised will be given each year to some deserving cause which helps animal welfare. As the result of last year's efforts some £10,000 was given towards the establishment and endowment of a Chair of Canine Medicine and Surgery in the Royal Veterinary College (for which the minimum sum of £20,000 is required) and this year the money collected will be devoted to the completion of this object. Truly a practical result for which the veterinary profession should feel grateful to Capt. Hobbs, the creator of these two ideas ; and to the Earl of Chesterfield and his hardworking Council for the successful manner in which they have carried the schemes out.

Correspondence

The Editor, THE VETERINARY JOURNAL, *London.*

Foreign Bodies in the Abomasum, in Merino Sheep. (June Issue.)

DEAR SIR,—

With reference to my article " Foreign Bodies in the Abomasum in Merino Sheep," published in your Journal dated June, 1929, the lick contained large pieces of uncrushed sulphate of copper, not sulphate of iron ; I regret my clerical error on this point.

I would like to state that inquiries made three or four months later showed that further cases did not arise after the lick was discontinued ; indicating that the sulphate of copper was destroying the bacteria necessary for cellulose digestion, and so indirectly causing the formation of these bodies.

Yours faithfully,

R. PAINE, F.R.C.V.S.,

Veterinary Institute, Grahamstown, S. Africa.

Personal

MR. G. B. SIMMINS, M.R.C.V.S., D.V.S.M., has been appointed Senior Veterinary Officer in Palestine.